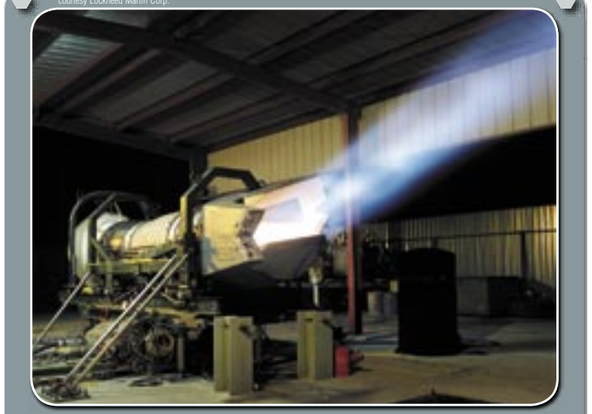
courtesy Lockheed Martin Corp.



More thrust

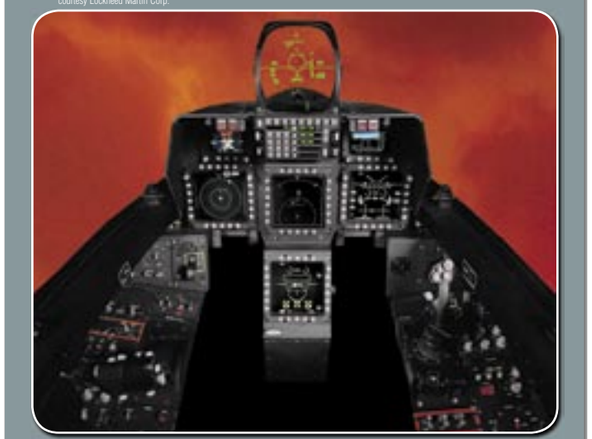
A Raptor specialty is the F119 engine's ability for thrust vectoring. The pilot is able to angle the engine's thrust up and down 20 degrees. This provides a high level of maneuverability during high-angle-of-attack maneuvers.

by Staff Sgt. Tanika Bell

Paperless maintenance

Raptor maintainers and technicians use portable maintenance aids to keep track of maintenance history, document completed or on-going work, plug into the aircraft to diagnose problems and to look up technical orders.

courtesy Lockheed Martin Corp.



Futuristic cockpit

The cockpit's six liquid-crystal digital displays and a heads up display (colored green), inform the pilot about tactical situations, self-defense and attack information and other sub-system data. The system gives the pilot a simple and complete picture of the tactical situation and superior situational awareness.

F/A-22

AIR DOMINANCE FOR DECADES

by Master Sgt. Orville F. Desjarlais Jr.
opening photo courtesy Lockheed Martin Corp.

By now, most people know the F/A-22 Raptor is a lean, mean fighting machine.

But what about the people who fly it and fix it? What's it like to know your work, your aircraft, your mission, is to provide American air dominance for decades to come?

"Everybody is excited (about getting the F/A-22)," said Lt. Col. James Hecker, 27th Fighter Squadron commander, whose Langley Air Force Base, Va., squadron is the first operational unit to fly the Raptor.

"We're the people with the new toy on the block. The esprit de corps, excitement, pride and teamwork to make the plane go [initial operating capability] is incredible," Colonel Hecker said.

For members of the Air Force's oldest fighter squadron, the F/A-22 means different things to different people.

Maintenance friendly

With 40 percent fewer parts than current fighter aircraft engines and many of its vital components located on the bottom of the engine for easier access, the F/A-22's F119 engine is a hit in the maintenance community.

"As for reliability, I can't say [enough about] how great it is," said Chief Master Sgt. Larry Martin, an aircraft maintenance unit superintendent. "Also, we can replace an engine in 90 minutes, as opposed to about four hours with the F-15."

Airman David Zepeda, a 19-year-old from South Bend, Ind., likes the newness of the program.

"I'm proud because we're at the beginning of this program and starting out with nothing, so everything we do now will be used by people in the future," said the 1st Component Maintenance Squadron aerospace propulsion apprentice. "It's cool that we're part of a new jet program."

Another unique Raptor aspect is the maintainers' ability to use portable maintenance aids that resemble a laptop computer. Maintainers on the flightline connect the handheld devices to the Raptor and perform operational checks, look up maintenance history and technical data, and document work done on the aircraft. No longer are reams and reams of technical orders required on the flightline — saving time and paper.

Pilot's dream

"Because of all the things it can do, it takes fewer Raptors to complete a mission than F-15s or F-16s," said Capt. John Echols, a Langley F/A-22 pilot. "Saying the F/A-22 is a great aircraft is an understatement. It's well worth every cent."

Instead of cockpit knobs and controls, F/A-22 on-board computers do much of the flying for pilots, freeing them up to concentrate on the overall battle or mission.

"We can go against threats that F-15s and F-16s wouldn't even think about trying to attack," Colonel Hecker said.

The air and ground threats the F-15 can no longer counter will be defeated by the F/A-22, according to Lockheed officials.

Perhaps the biggest advantage F/A-22 pilots have over others is the ability to shoot at the enemy before the enemy even knows a Raptor is there — that, and blazing speed. The faster they fly, the less time an enemy has to react. Combining speed with stealth equates to a lethal one-two punch for any enemy.

However, even with all that gee-whiz technology at their fingertips, Raptor pilots still need support, especially with intelligence.

Avoiding the threat

Senior Airman Brandon Wright is a 27th Fighter Squadron intelligence analyst at Langley. The 23-year-old joined the Air Force so he could play an active role in defending his country.

"I refresh pilots on the threats and what can shoot them down," Airman Wright said.

At first, the mission planning briefings he gave to pilots made him nervous. But now, it's all in a day's work.

"We're working with top-of-the-line aircraft," the Airman said. "It's important to the United States and the mission. I have a role in that and my role is important."

Unlike the aircraft, none who works with the F/A-22 is new. They have different levels of experience that intertwine with the service's newest fighter aircraft program. However, no matter how long they've been in the Air Force, there is a pioneer spirit that permeates the wing, and each of them — from airman basic to colonel — play their part in helping provide air superiority for decades to come.

Stealthy Features

Stealth means flying undetected by the enemy. The Raptor excels at “stealthiness” in a variety of ways.

Illustrations courtesy Lockheed Martin Corp.

Internal weapons bays
In addition to a 20mm cannon build into the bottom of the aircraft, the Raptor can carry six AIM 120C missiles, or two AIM 9s. Or, it can be re-configured to carry two 1,000-pound Joint Direct Attack Munitions. It can also carry small diameter bombs. In either configuration, all weapons are carried internally to preserve the stealth characteristics of the airframe.

Mask of invisibility
The paint reduces the Raptor’s infrared visibility, making it hard to find by heat-seeking missiles. The paint scheme also makes it difficult to see with the naked eye. When radar operators look at the Raptor, its radar cross-section is thought to be that of a small bird or large insect.

Radome
It’s shaped to reflect radar signals at most frequencies. It’s also the first fighter to feature a frameless canopy, eliminating radar returns. Since the pilot’s helmeted head is a sounding board for radar, the aircraft’s canopy glass is coated with a film that allows upwards of 85 percent of visible energy to pass through it. The film reflects the majority of the radar energy.

Super-duper fast
The Raptor’s supercruise capability is another stealth contributor. Not only does it allow the pilot to get in and out quickly, spending less time in hostile territory, it reduces the jet’s wake signature. An aircraft with full afterburners on creates a significant radar return. Since the Raptor can go supersonic without afterburners, its radar signature is insignificant.

Shapely aircraft
Viewed head-on, the Raptor presents a low-height triangle that makes it appear to crouch on the tarmac. The fuselage and canopy features sloping sides and the fins tilt outward. Engineers ensured that major surfaces were not parallel to each other. All these design features minimize radar return, resulting in a stealthy aircraft.

History of America’s future fighter

Late 1970s It’s the final decade of the Cold War. The Air Force and contractors are studying various stealthy aircraft configurations. Such studies helped design the first F-117 Nighthawk. However, the Air Force wanted more for its next generation fighter plane.

1981 Development begins on advanced tactical fighter program to meet what is perceived as a growing Soviet air power threat, and to replace the aging F-15 Eagle.

1990 Air Force selects Lockheed’s YF-22 design for its next future fighter.

1994 The number of F-22s scheduled for procurement is reduced to 442 aircraft, down from an expected purchase of 750.

1997 The Quadrennial Defense Review cut the number to 339. On April 9, Lockheed-Martin-Boeing rolls out the first Raptor.

1998 In February, the first F/A-22 is delivered to Edwards Air Force Base, Calif. In October, the aircraft travels faster than the speed of sound for the first time — 51 years to the week after the sound barrier was broken over Edwards.

2003 The F/A-22 Combined Test Force at Edwards Air Force Base, Calif., puts the Raptor through its paces.

2005 The 1st Fighter Wing at Langley Air Force Base, Va., is the first operational base to receive F/A-22s.